

IN THE CLAIMS

Please amend the claims as indicated in the following List of Claims.

1. (currently amended) An apparatus for providing and circulating to a medical device a medical gas mixture comprising at least two components, said apparatus comprising:
 - a main gas circuit for recirculating the medical gas mixture and comprising:
 - a constant speed circulation pump for pumping gas through the main circuit and increasing the gas pressure from a lower pressure to a higher pressure,
 - a pressure maintaining valve downstream of the pump and dividing the main circuit into a higher pressure section and a lower pressure section in order to maintain a constant pressure in the higher pressure section,
 - a medical gas outlet in the higher pressure section,
 - a spent gas inlet in the lower pressure section,
 - a first feed gas supply inlet in the higher pressure section,
 - a second feed gas supply inlet in the higher pressure section downstream of the medical gas outlet and upstream of the pressure reduction valve,
 - concentration determining means for measuring the concentration of at least one component of the recirculating medical gas mixture in the main circuit and generating a signal indicative of said concentration,
 - circuit volume regulating means for varying the volume of the main circuit at a location in the lower pressure section for maintaining a predetermined gas flow to the pump and generating a signal indicative of said volume, and
 - means for venting gas from the main circuit;
 - a first feed gas supply conduit for supply to the first feed gas supply inlet of a first feed gas of predetermined composition;
 - first feed gas supply flow control means for controlling the flow of first feed gas through the first gas supply conduit in response to the signal from the concentration determining means to maintain constant the medical gas composition at the pump inlet;
 - a second feed gas supply conduit for supply to the second feed gas supply inlet of a second feed gas of predetermined composition different from the first feed gas;
 - second feed gas supply flow control means for controlling the flow of second feed gas through the second gas supply conduit in response to the signal from the circuit volume regulating

means to maintain constant the recirculating medical gas composition; and

a medical device supply circuit for connecting the medical device to the main circuit to receive a portion of the medical gas from the medical gas outlet thereof and to return spent gas to the spent gas inlet thereof and comprising:

flow control means in the medical device supply circuit for controlling flow of the medical gas to the medical device and

purification means in the medical device supply circuit for removing contaminant(s) from the spent gas.

2. (cancelled)

3. (previously amended) The apparatus according to Claim 1, wherein the pressure maintaining valve is a spill valve.

4. (previously amended) The apparatus according to Claim 1, wherein the circuit volume regulating means comprises expansion bellows.

5. (previously amended) The apparatus according to Claim 1, wherein the concentration determining means comprises an analog electrical circuit for the signal thereof and the circuit volume regulating means comprises an analog electrical circuit for the signal thereof which is of lower gain than that of the circuit for the signal of the concentration determining means, whereby the increase in flow rate of the first feed gas is quick relative to the increase in flow rate of the second feed gas.

6. (previously amended) The apparatus according to Claim 1, wherein the concentration determining means measures at least oxygen concentration.

7. (cancelled)

8 (cancelled)

9. (previously amended) The apparatus according to Claim 1, which further comprises an ultrasonic xenon analyser.

10. (previously amended) The apparatus according to Claim 1, wherein the means for venting gas from the main circuit comprising a gas recovery space for storing at least a portion of the vented gas.

11. (previously amended) The apparatus according to Claim 10, wherein the gas recovery space is an ullage space of a container providing one of the feed gases.

12. (previously amended) A medical device system comprising a medical device connected to the medical device supply circuit of an apparatus as defined in Claim 1.

13. (previously amended) The system according to Claim 12, wherein the medical device is an artificial ventilator.

14. (previously amended) The system according to Claim 12, wherein the medical device is a cardiopulmonary bypass oxygenator.

15. (cancelled)

16. (currently amended) A method of providing a medical device with a medical gas mixture comprising at least two components, said method comprising:-

recirculating the medical gas mixture in a main circuit by a constant speed circulation pump to provide a higher pressure section maintained at constant pressure in series with a lower pressure section;

withdrawing a portion of the medical gas mixture from the higher pressure section and feeding said portion to the medical device;

removing contaminant(s) from the spent gas mixture from the medical device and returning the decontaminated spent gas to the lower pressure section;

measuring the concentration of at least one component in the recirculating medical gas mixture in the main circuit and generating a concentration signal indicative of said concentration;

replenishing components in the medical gas mixture by addition of feed gases to the higher pressure section to maintain the recirculating medical gas composition constant, a first feed gas being supplied through a first feed gas supply inlet and a second feed gas of predetermined

composition different from the first feed gas being supplied through a second feed gas inlet; and
varying the volume of the main gas circuit at a location in the lower pressure section to
maintain the a predetermined gas flow therein to the pump and generating a volume signal
indicative of said volume;

the flow of gas through the first feed gas supply inlet being controlled in response to the
signal concentration to maintain constant the medical gas composition at the pump inlet and
the flow of gas through the second feed gas supply inlet being in response to the volume
signal to maintain constant the recirculating medical gas composition.

17. (cancelled)

18. (cancelled)

19. (cancelled)

20. (cancelled)

21. (cancelled)

22. (cancelled)

23. (cancelled)

24. (previously amended) A method for the extracorporeal treatment of blood by contacting blood with a recirculating medical gas mixture in a device provided with the medical gas mixture using a method defined in Claim 16.

25. (new) The method according to Claim 16, wherein medical gas mixture consists of oxygen and xenon.

26. (new) The method according to Claim 25, wherein the first feed gas is oxygen and the second feed gas is a mixture of xenon and oxygen.

27. (new) The method according to Claim 16, wherein medical gas mixture consists of oxygen, xenon and nitrogen.

28. (new) The method according to Claim 27, wherein the first feed gas is oxygen and the second feed gas is a mixture of xenon and oxygen and air is supplied as a third feed gas.

29. (new) The method according to Claim 27, wherein the first feed gas is oxygen, the second feed gas is xenon and nitrogen is supplied as a third feed gas and the concentrations of oxygen and nitrogen are measured.

30. (new) The method according to Claim 27, wherein the first feed gas is oxygen, the second feed gas is xenon and nitrogen is supplied as a third feed gas and the concentrations of oxygen and xenon are measured.